

B – Amendments to the Claims

Please cancel claims 32 to 57 without prejudice or disclaimer. Please add new claims 58 to 70.

58 (New) A method of determining flow rates in a multiphase fluid flowing in a well, comprising:

- positioning an apparatus in the well, said apparatus being provided with a main body portion that automatically lies in the bottom of the well when said well is inclined or horizontal;

- providing said main body portion with a first pair of sensors, said pair comprising a speed sensor for measuring local speed of the flowing fluid and a proportion sensor for measuring local proportions of the flowing fluid;

- measuring with said first pair of sensors the local speed of the flowing fluid in the vicinity of said main body portion and the local proportions of the flowing fluid in the vicinity of said main body portion;

- measuring in a first region of the well a second pair of:

- (i) the local speed of the flowing fluid in a first location of the well; and

- (ii) the local proportions of the flowing fluid in a second location of the well, such that said first and second locations are in alignment with each other on a line parallel to the axis of the well;

- measuring simultaneously in a second region of the well a third pair of said local speed and said local proportions, wherein the first and the second regions are in the same plane containing the axis of the well.

59. (New) A method as claimed in claim 58, wherein said first and second regions are distributed across the entire width of the well.

60. (New) A method according to claim 58, wherein said plane containing the axis of the well is vertical.

61. (New) A method as claimed in claim 58, wherein the well is inclined from vertical, the method comprising measuring a second pair of local speed and local proportions of the flowing fluid in a first region lying at the bottom of the vertical plane of the well, and measuring third pairs of local speed and local proportions of the flowing fluid in second regions distributed across the entire width of the well in the vertical plane.

62. (New) A method as claimed in claim 58, in which a section element (Δs_i) of the well is assigned to each region, and the overall flow rate Q of each phase is determined from the relationship:

$$Q = \sum_i q_i \cdot \frac{\Delta s_i}{S}$$

where S is the total vertical section of the well

and q_i is the flow rate of each phase in section element Δs_i ,

with $q_i = v_i \cdot h_i$

where v_i is the local speed of each phase in section element Δs_i

and h_i is the local proportion of each phase in section element Δs_i .

63. (New) A method as claimed in claim 58, wherein said first and second locations are at the same point in each first and second regions.

64. (New) Apparatus for determining flow rates in a multiphase fluid flowing in a well, comprising:

- a tool body to be positioned in the well, said tool body comprising:
 - a main body portion that automatically lies in the bottom of the well when said well is inclined or horizontal; and
 - at least a deployable arm that is supported by the main body portion at one end and that can be deployed from a position inside said main body portion to a position where it occupies the entire diameter of the well;

- a first sensor pair mounted on said main body portion, said pair comprising a speed sensor for measuring local speed of the flowing fluid in the vicinity of said main body portion and a proportion sensor for measuring the local proportions of the flowing fluid in the vicinity of said main body portion;
- a second and a third sensor pairs, each sensor pair comprising:
 - speed sensor mounted on the deployable arm for measuring local speed of the flowing fluid in a first location of the well; and
 - proportion sensor mounted on the deployable arm for measuring local proportions of the fluid flowing in a second location of the well;wherein said speed and proportion sensors are arranged such that said first and second locations are in alignment with each other on a line parallel to the axis of the well;

wherein said second and third sensor pairs lie in the same plane containing the axis of the well.

65. (New) Apparatus as claimed in claim 64, wherein, in use, said second and third pairs of speed and proportions sensor means are distributed across the entire width of the well.

66. (New) Apparatus as claimed in claim 64, wherein when the well is inclined from vertical, said plane containing the axis of the well is vertical and the second pair of speed and proportions sensor means lies at the bottom of said vertical plane.

67. (New) Apparatus as claimed in claim 65, further comprising a pair of speed and proportions sensor means lying at the top of the vertical plane of the well

68. (New) Apparatus as claimed in claim 64, wherein each pair of the speed sensor means and the proportions sensor means are included in multi-sensor assemblies.